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| 10/551,993 | 10/04/2005 | Hiroshi Tamagaki | 279148US0PCT | 6455 |
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| OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | | |
| EXAMINER | | | | |
| MILLER, JR, JOSEPH ALBERT | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 1792 | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/551,993

Applicant(s)

TAMAGAKI ET AL.

Examiner

JOSEPH MILLER JR

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/88)
Paper No(s)/Mail Date 01/04/2006, 10/04/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Observations

Claim 1, as written, teaches a method of treating a substrate in preparation for the deposition of a film, it does not require any deposition step. The statement that the substrate includes a substrate having a film previously formed thereon does not form a requirement that a film must already exist on the substrate. Claim 8 depends on claim 1 and is not being objected to, but it is noted that the alumina film of claim 8 is actually not required by claim 1.

Specification

The disclosure is objected to because of the following informalities: through the document, some instances of "alpha" are indicated only as "a" instead of using the "alpha" Greek letter.

Appropriate correction is required.

Claim Objections

Claims 2 and 11 are objected to because of the following informalities: claim refers to the "a" crystal structure which should be "alpha".

Claim 10 is objected to because it states that the alumina film is made "on the film". The film this reference is made to appears to be that within "including a substrate having a film previously formed thereon", however, this needs to be made clearer.

Claim 11 is objected to because of the following informalities: claim states that "processing is performed in **that** order" but the claim is not specific enough – it does not require that ALL process steps are performed in the order that is described in the sentence. Claim should be rewritten in a manner that more clearly presents the apparent intent of ordering of process steps.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Hay (4,968,426).

Hay teaches a method for the formation of fine alpha alumina membranes (abstract). Hay teaches the formation of the alumina film on a membrane by coating with a layer of aluminum hydrate gel containing seed particles (col 2, lines 60-68). The

seed particles are preferably alpha aluminum which is a result of milling (and therefore inherently a powder) (col 3, lines 23-27).

Instant claim states that the surface is treated with a powder mainly having the crystal structure the same as the alpha structure. It does not limit the overall composition of the (other) materials that might be used in the treating process.

Claim 1-3, 8, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Schaeffer (6,123,997).

Schaeffer teaches a method for forming a thermal barrier coating (abstract). Schaeffer teaches the deposition of a bond coat (col 3, lines 33-38) and then the treatment of the bond coat with alpha alumina particles to drive the formation of a mature alpha alumina film on the bond coat (col 7, lines 20-35).

Regarding claim 2, the use of alpha particles is taught by Schaeffer.

Regarding claim 3, Schaeffer teaches "submicron" oxides (col 7, line 29).

Regarding claim 8, an alpha alumina film is grown by heating in an oxygen-rich environment (col 6, lines 48-50). The oxygen content is of importance (col 6, lines 1-5) and therefore this clearly constitutes a "gas-phase" growth method.

Regarding claim 10, Schaeffer teaches the process yields a coating on a substrate (col 2, lines 30-35).

Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Rostoker (5,389,194).

Rostoker teaches a method for cleaning semiconductor substrates after polishing (title). Rostoker teaches using alumina particles, mainly in the alpha phase, in a polishing process after a top layer is deposited on a substrate (abstract).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang (4,788,077).

Kang teaches a thermal spray coating and preparation method (abstract). Kang teaches the blasting of alumina particles onto a substrate surface followed by the cleaning in an ultrasonic cleaner to "reduce the amount of loosely attached alumina particles" (col 9, lines 5-11).

Since the particles are loosely attached, it is obvious and/or inherent that the ceramic (alumina) powder would be dispersed within the solution as a result of the submersion of the substrate in the solution. As written, claim 1 does not specifically require that a film exists on the surface before the pretreatment step, however, as Kang teaches, there is one treatment step where the particles are applied and a second step where the ultrasonication is performed.

Kang does not specifically teach the application of alpha alumina particles, but teaches the use of a specific alumina grit/size (col 10, lines 58-68), therefore it would have been obvious to someone of ordinary skill in the art at the time of the invention to choose an alumina particle (i.e. alpha alumina) appropriate for the purpose.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schaeffer (6,123,997) in view of Hecht (3,928,026).

Schaeffer teaches a method for forming a thermal barrier coating (abstract). Schaeffer teaches the deposition of a bond coat (col 3, lines 33-38) and then the treatment of the bond coat with alpha alumina particles to drive the formation of a mature alpha alumina film on the bond coat (col 7, lines 20-35).

Schaeffer teaches the use a MCrAlY layer as a bond layer, but does not teach the composition required in claim 4.

Hecht teaches the formation of MCrAlY layer (abstract) and the inclusion of Al, B and C in the alloy (col 2, lines 30-55). It would have been obvious to someone of ordinary skill in the art at the time of the invention to apply the MCrAlY taught by Hecht to the alumina film forming method of Schaeffer because the alloys stated by Hecht are well known alloys in the art; furthermore Schaeffer teaches that one may use alloys such as those taught by Hecht in his invention (col 3, lines 24-27).

Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaeffer (6,123,997) in view of Hecht (3,928,026) as applied to claim 4 above and in further view of Kikuchi (4,341,834).

Schaeffer teaches a method for forming a thermal barrier coating (abstract). Schaeffer teaches the deposition of a bond coat (col 3, lines 33-38) and then the

treatment of the bond coat with alpha alumina particles to drive the formation of a mature alpha alumina film on the bond coat (col 7, lines 20-35).

Hecht teaches the formation of MCrAlY layer (abstract) and the inclusion of Al, B and C in the alloy (col 2, lines 30-55). It would have been obvious to someone of ordinary skill in the art at the time of the invention to apply the MCrAlY taught by Hecht to the alumina film forming method of Schaeffer because the alloys stated by Hecht are well known alloys in the art; furthermore Schaeffer teaches that one may use alloys such as those taught by Hecht in his invention (col 3, lines 24-27).

Schaeffer in view of Hecht teaches various compositions of the bond layers on the substrate onto which an alumina layer will be deposited, but does not specifically teach the use of a layer such as a TiC, TiN or TiCN layer.

Kikuchi teaches coated super hard alloy articles (title). Kikuchi teaches that the substrate for which an aluminum oxide layer may be formed can include a layer of TiC, TiN or TiCN (abstract).

It would have been obvious to someone of ordinary skill in the art at the time of the invention to apply the use of a TiCN layer instead of the MCrAlY layer taught by Schaeffer because one could substitute the substrate with a reasonable expectation of success based on Kikuchi's successful formation of an alumina film on a substrate containing TiCN. Furthermore, Schaeffer and Hecht teach all of the elements involved.

Regarding claim 11, Schaeffer teaches application of the film laminate to vanes and blades of turbines and therefore teaches a method of producing a film-coated part (col 1, lines 25-30).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schaeffer (6,123,997).

Schaeffer teaches a method for forming a thermal barrier coating (abstract). Schaeffer teaches the deposition of a bond coat (col 3, lines 33-38) and then the treatment of the bond coat with alpha alumina particles to drive the formation of a mature alpha alumina film on the bond coat (col 7, lines 20-35).

Schaeffer teaches the step of treating a surface with alpha alumina particles (col 7, lines 20-35), but does not specifically teach the step of immersing and ultrasonically treating the substrate in a liquid in which the ceramic powder is dispersed.

Schaeffer does teach that the alumina particles may be exposed "such as by slurry" as a "submicron dispersion of oxide particles" (col 7, lines 24-29). It would have been obvious to someone of ordinary skill in the art at the time of the invention to immerse the substrate and expose to ultrasonication as these are well known methods for exposing a substrate to a slurry of particles. It would have been obvious to someone of ordinary skill in the art at the time of the invention to ultrasonicate a submerged substrate in the slurry of Schaeffer because it is well known that ultrasonication moves particles around and helps ensure proper exposure to all areas of the surface.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH MILLER JR whose telephone number is (571) 270-5825. The examiner can normally be reached on Monday through Thursday from 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/JOSEPH MILLER JR/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792